Determinants of Corporate Capital Structure:

Australian Evidence

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ABSTRACT

This study seeks to provide evidence on the importance and significance of capital structure determinants in the Australian context. The analysis was implemented on a sample of 226 Australian companies from 1977 to 1985. The following results are obtained.

Company non-debt tax shields display a negative relationship with respect to each of the debt ratios. This evidence is consistent with the theory proposed by DeAngelo and Masulis (1980) that firms with non-debt tax shields at their disposal can use these as substitutes for interest tax shields. The evidence canvassed also lends some support to the pecking order hypothesis of Myers and Majluf (1984). Specifically, significant negative relationships between profitability and all debt ratios are found. The implication is that the sample of firms studied prefer to finance investments with internally retained funds before issuing debt. Some evidence of a size effect is present and this indicates that the larger firms in the sample tended to employ more debt in their capital structures. The positive relationship between cash holdings and debt ratios indicates some support for the free cash flow hypothesis of Jensen (1986), although these estimates are not significant. No support for the growth opportunity and collateral value attributes as determinants of debt ratios can be discerned, consistent with Titman and Wessels (1988).
DETERMINANTS OF CORPORATE CAPITAL

STRUCTURE: AUSTRALIAN EVIDENCE

Modigliani and Miller (1958) prove the irrelevance of capital structure to firm value in perfect markets and without taxes. This ideal characterization has since provided the impetus for subsequent research which has demonstrated that a firm’s capital structure decision is a function of its corporate environment which include corporate and personal taxes, bankruptcy costs, contract law, and a host of other related factors. In essence, the existence of these factors, commonly referred to as determinants, implies that a firm’s capital structure decision cannot be detached from its corporate environment. This hypothesised dependency has been the subject of empirical verification in a number of UK and US studies (Long and Malitz (1985), Bradley, Jarrel and Kim (1986) and Titman and Wessels (1988)). In particular, a recent paper by Titman and Wessels (1988) provides some fresh and interesting evidence, using a relatively new and innovative methodology. Given the dearth of similar work in Australia, this paper seeks to contribute to the current debate on the importance and significance of capital structure determinants. Toward this end, the linear structural equation modeling approach pioneered by Titman and Wessels (1988) will be applied to Australian corporate data for the period 1977 to 1985. In section II we briefly review previous research. This is followed by an exposition of the methodology in Section III and a description of the data is contained in Section IV. Section V presents and discusses the results. The paper ends with a summary of findings and suggestions for future research in Section VI.
II. PREVIOUS RESEARCH

In this section we state the hypothesised relationships of the major determinants with debt. The underlying theories and previous empirical evidence are also briefly reviewed.

COLLATERALIZABLE VALUE OF ASSETS

Collateralizable assets are those assets which creditors require as security for a loan. Arguments put forward by Jensen and Meckling (1976) and Myers and Majluf (1984) suggest the use of debt financing to contractually bond and align managers' interests with those of shareholders. Debt financing introduces the interplay of debt covenants and financial reporting requirements of regulatory bodies which restrict managers' ability to consume excessive perquisites and subject their actions to public scrutiny. Thus, the costs associated with agency problems may be reduced. High levels of debt finance, however, are only feasible if firms can offer tangible collateral as security.

In addition, creditors that are wary of transfers of wealth away from them to shareholders would require their loan advances to be secured or collateralized against tangible assets since this restricts the use of the funds to a specific project and gives creditors a recourse to the value of the asset in case of default (Galai and Masulis (1976) and Myers (1977)). Without collateralizable assets, the cost of borrowing may be prohibitively high (creditors may demand very generous discounts or high interest repayments as a prerequisite to making the loan). Hence, their existence increases a firm's borrowing opportunities and is thus positively related to debt.
In contrast, the use of debt also controls managers' tendency to consume excessive perquisites by introducing the threat of bankruptcy. Managers are adverse to bankruptcy because of its negative impact on their compensation plans and job security (Grossman and Hart (1982)). The hypothesis flowing from this is that firms with less tangible assets (less collateralizable assets) should use more debt to monitor managerial activity even if raising debt finance under this circumstance is costly: a trade-off between agency costs and expensive debt financing occurs.

Direct empirical evidence on this determinant was provided by Bradley, Jarrel and Kim (1984) who found that the asset structure of a firm (proxied by tangible assets such as plant and equipment) was positively related to debt. Titman and Wessels (1988), on the other hand, tested this determinant but found it to be insignificant at the 5% level for all the dependent debt ratios\(^1\). Some indirect evidence was provided by Marsh (1982) who conducted a time series study and report that larger firms with a larger tangible asset base tended to use more debt. This would appear to be consistent with the hypothesised positive relationship above. In order to sustain high levels of debt in a firm, tangible assets which can be used as collateral are essential in a firm's capital structure.

**NON-DEBT TAX SHIELDS**

Australian tax laws allow certain tax deductions to be made from a company's taxable income. These deductions are often associated with depreciation expenses on assets (e.g. machinery, building and equipment) or on research and development costs

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\(^1\) Titman and Wessels used six different debt ratios: short-term, long-term and convertible debt standardized by book value and market value of equity respectively. The collateral value attribute was significant at the 10% level for only one debt measure: short-term debt over book value of equity.
expensed (see for example, sections 73B, 73C and 73D of the Income Tax Assessment Act 1936 (Cth)).

Arguments put forward by Modigliani and Miller (1963) suggest that firms gain an advantage in the form of tax deductions associated with interest payments on debt. Subsequently, DeAngelo and Masulis (1980) formalised a framework whereby tax deductions (tax shields) which are not associated with debt act as substitutes for interest deductions. These "non-debt tax shields" minimise the use of debt by providing tax advantages similar to debt. Therefore, it is hypothesised to be a factor which determines the level of debt held in a firm and is negatively related to the debt level.

Empirically, this relationship has been difficult to discern. This may, in part, be due to difficulties associated with deriving an accurate measure of non-debt tax shield. The task is further complicated by differences in accounting regulation and tax laws resulting in different treatments of accounting numbers such as research and development costs and depreciation expenses. Cross-sectional studies by Bradley, Jarrel and Kim (1984), Long and Malitz (1985) and Titman and Wessels (1988) did not lead to a consensus. Bradley, Jarrel and Kim (1984) regressed leverage against, among other things, a proxy for non-debt tax shield\(^2\) but found a perverse result. The relationship was significant but positive. Long and Malitz (1985) conducted a similar study and found a negative but insignificant relationship. Titman and Wessels (1988) used structural modelling but did not improve on the results obtained by Long and Malitz in terms of significance.

\(^2\) This non-debt tax shield was defined as the ratio of depreciation plus investment tax credits to earnings.
Studies of dynamic capital structure by MacKie-Mason (1988) and Sharpe and Pooley (1990) also reported results which contradicted the hypothesised relationship. Although MacKie-Mason found a significant result, the non-debt tax shield parameter was positively related to leverage\(^3\). Sharpe and Pooley (1990) regressed their measure of non-debt tax shield on the capital ratio\(^4\) of finance companies and hypothesised that the relationship should be positive, but, found it to be negative and insignificant.

**SIZE**

Bankruptcy costs arguments imply that the risk of bankruptcy discourages managers from using debt in a firm's capital structure (Shapiro and Titman (1985), Castanias (1983)). It is suggested, however, that large firms hold more diversified portfolios as compared to relatively smaller firms and hence face a lower bankruptcy risk. Hence, large firms are hypothesised to be able to support more debt (Smith and Warner (1979)).

A counter hypothesis is probable. It is conceivable that large firms incur relatively lower transactions costs\(^5\) in issuing new equity when compared to smaller firms and hence would hold less debt relative to a smaller firm. The implication is that firm size play an important role in determining a firm's capital structure.

Among studies investigating this aspect are Ferri and Jones (1977), Marsh (1982),

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\(^3\) In his discussion, MacKie-Mason suggested that the relationship was negative but his tabulated results clearly showed the parameter to be positive and significant.

\(^4\) Capital ratio was defined as the ratio of capital to total assets.

\(^5\) See for example, Smith (1977).

Cross-sectionally, Friend and Hasbrouck (1988) and Crutchley and Hansen (1989) found significant positive size estimates. Crutchley and Hansen reported that their results support the diversification cost effect of firm size; that is, larger firms demonstrated increased leverage. Titman and Wessels (1988) on the other hand, found some evidence that firm size and leverage were negatively related but concluded that, due their definition of leverage, the evidence was more indicative of a relationship between market values of equity and firm leverage rather than any size effect. Specifically, they found that their size attribute was related to long-term debt scaled by book values of equity but not to long-term debt scaled by market values of equity. Since they used the natural logarithm of sales as the indicator of size, it was related to the market value of the firm. Therefore, large firms have higher market values and are able to include more debt in their capital structures (Titman and Wessels (1988, p.14)).

Ferri and Jones (1979) grouped firms into six leverage classes and tested different measures of size across these groups. They reported that the measures differed across industry groups but more importantly that firm size had a significant impact on leverage. Both Marsh (1982) and Sharpe and Pooley (1990) found significant long run relationships between size and leverage, consistent with expectations.

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6 These measures are current and average sales.
PROFITABILITY

Following Ross' (1977) signaling theory, and in the presence of asymmetric information, managers are expected to effect capital structure changes to indicate the future profitability of a firm. Alternatively, if managers share in firm profitability via compensation plans and are primarily responsible for a firm's financing decisions, a nexus is forged between firm profitability and managerial wealth. The desire to signal future profitability, therefore, stems from managerial preferences (Blazenko (1987)). Future profitability is viewed, under both propositions, as an attribute which determines a firm's capital structure and is expected to be positively related to leverage since managers utilize debt to signal investments which yield high profits in the future.

A competing hypothesis concerning profitability can be discerned from Myers' (1984) pecking order theory. Under this approach, firms prefer to use internal funds to finance investments before raising debt, and then, as a last resort, equity. A more profitable firm is expected to have access to greater internal finances and hence, will tend to hold less debt in its capital structure. "Profitability" in this context refers to past profitability which determines the level of funds retained and is expected to be negatively related to debt.

Among tests of profitability as a determinant are cross-sectional studies by Friend and Hasbrouck (1988) and Titman and Wessels (1988). Both found significant negative relationships between leverage ratios and profitability consistent with the predictions of the pecking order hypothesis. In an Australian time series study, Sharpe and Pooley (1990) also found a significant long run relationship between profitability and leverage consistent with the pecking order hypothesis.
GROWTH OPPORTUNITIES

Myers (1977) identified two types of assets of a firm: tangible assets and growth opportunities. Growth opportunities give managers greater discretion in their choice of future investments. This increases the difficulty of monitoring managerial activity and raises the agency cost of equity, such as those associated with curbing the tendency for equity controlled firms to effect wealth transfers from debtholders to shareholders by investing sub-optimally. Expected future growth is thus, hypothesised to be negatively related to long term debt levels. Myers (1977) also suggested the use of short-term debt to reduce costs associated with contractually bonding management. If an investment opportunity arises before a debt matures then firms never get to invest sub-optimally. Long-term debt can be replicated by rolling-over short-term debt and sub-optimal investments will always be avoided.

Further, a negative relationship between debt and growth opportunities is also probable if growth opportunities are viewed as intangible assets which are not collateralizable for the purposes of borrowing funds. Hence, a firm's borrowing capacity is limited to the extent that their assets are in the form of intangible or unrealised growth opportunities.

Recent empirical evidence lends support to the hypothesised negative relationship between growth and leverage. Bradley, Jarrel and Kim (1984) found that their proxy for intangible assets (recall from above that this may be representative of future growth opportunities) is significantly negatively related to leverage.

Titman and Wessels (1988) also found a significant negative relationship between
growth and debt weighted by book values of equity. This appears to support the agency-hypothesis that growth opportunities allow greater discretion in investment decisions of the firm.

*CASH HOLDINGS*

The level of cash holdings in a firm is a measure of internal funds available for financing investments and is hypothesised to be a determinant of capital structure. Work on asymmetric information by Myers (1984) and Myers and Majluf (1984) predicted that firms prefer to finance first with internal funds (retained profits) and then with external claims that are least risky (i.e. firms first issue bonds then equity as a last resort). The debt level can be expected to be negatively related to the amount of cash holdings of a firm.

In contrast, Jensen (1986), arguing within the context of takeovers, suggested that cash-rich firms make attractive takeover targets. Jensen argued that managers are motivated to increase firm size as this is related to their prestige and compensation. In achieving their aim, managers may undertake sub-optimal projects (negative NPV or non-optimal positive NPV). Financing these projects with external funds imposes the scrutiny of capital market agents and attracts negative publicity. If a firm has sufficient unencumbered internal funds, however, managers acquire the flexibility to invest in any unprofitable project without the watchful eye of investors and regulatory bodies. The most valuable source of unencumbered funds available to managers under this scenario is its cash holdings. The implication of the takeover argument is that cash-rich firms undertaking unprofitable investments will be heavily discounted by the market and make
attractive targets. Jensen suggested that firms with high levels of "free cash flow"⁷ should use debt to prevent managers from wasting it. He also argued that managers have an incentive to disgorge the cash because the agency cost of free cash flow eventually decreases the value of the firm and as a result impacts negatively on managerial compensation plans. The introduction of debt increases external repayments and thus reduces the firm's free cash flow. The debt-equity structure of a firm (i.e. its capital structure) is viewed as an effective bonding mechanism.

To the our knowledge, this attribute as one of the determinants of capital structure has not been empirically tested prior to this study.

UNIQUENESS

Following Titman (1985), firms in highly specialised industries suffer greater losses in bankruptcy as compared to less unique firms. The workers in these industries are often specialists in their particular field and are less employable in the event of retrenchment. In addition, their customers may find it difficult to obtain servicing for their specialised products. Suppliers of specialised firms also suffer financially since they handle very specific products for unique processes which are not employed by other industries in general. Because of the risks faced by these unique firms, they try to minimise the use of debt to maintain a low risk profile.

Empirically, Titman and Wessels (1988) found that firms in unique industries have low debt ratios. That is, firms choose low debt ratios if, in the event of liquidation, its

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⁷ Jensen (1986, p.324) defined "free cash flow" as the "cash flow in excess of that required to fund all of a firm’s projects that have positive net present values when discounted at the relevant cost of capital".
customers, workers and suppliers face very high costs.

**DIRECTORS’ HOLDINGS**

Management’s stake in a firm is often reflected in its holdings of stock in the corporation. This holding can be quite large if they are part of a managerial compensation scheme. Managerial wealth in a firm is also derived from a significant investment in human capital specific to the firm. Managerial ownership is, therefore, largely undiversifiable. In contrast, shareholders’ liability to a firm is limited to their holdings of stock. Risk in their holdings can be diversified with other investments. The manager, therefore, has greater incentive to ensure the continued viability of a firm and is likely to minimise debt holdings. As the proportion of managerial holdings in the firm increases, less debt is expected to be used. This is consistent with the effect of managerial ownership structure on firm capital structure hypothesised by Demsetz and Lehn (1985).

Friend and Hasbrouck (1988) tested directors’ shareholdings as a determinant of firm capital structure. They found the relationship to be negative and significant with respect to debt, thus, providing supporting evidence for the above hypothesis.

A summary of the above hypothesised relationships between debt and determinants is contained in Table 3.

**III. METHODOLOGY**

Two dominant strands of empirical estimation have been employed in the study of capital structure determinants. The first of these are cross-sectional analyses which focus
on the incremental impact of hypothesised determinants on firm leverage. The second strand, the time series models, emphasise the long-run or target ratio of firm debt to equity, testing, in conjunction, the presence of any significant adjustment costs. The research design in this study, follows the first of these approaches, holding constant any trends in firm capital structure. In addition, an improved estimation procedure is employed to mitigate some of the problems associated with measurement and specification errors which plagued previous studies. In this section we give a brief review of the theoretical underpinnings of the linear structural equation modeling approach. The exposition expands on that of Titman and Wessels (1988) who pioneered this technique in capital structure research.

THE LISREL MODEL

The model used in this study is adopted from Titman and Wessels (1988). It is an adaptation of a model developed by Karl Jöreskog and Dag Sörbom called LISREL (Linear Structural Relationships). LISREL has its genesis in structural equation modeling and it is instructive at this stage to discuss the concept of latent variables, the role of observable variables and structural equation models.

The Role of Latent and Observable Variables

In studying phenomenon in the social sciences, the objects of interest are often a collection of theoretical concepts or constructs which are unobservable. These are also known as latent variables or factors. Some examples of latent variables in capital structure theory include managerial self-interest, uniqueness of products and expectations of growth.
Latent variables, by definition, cannot be measured directly. Researchers, therefore, must derive some way of measuring them by using observable variables. In empirical work on capital structure, these observations may include balance sheet items such as total assets and shareholders' equity and share price information from the stock exchange - all of which are measurable items. These items are called observed variables or indicator variables (these two terms are used interchangeably) and are assumed to represent the underlying construct or latent variable but not without error.

**Structural Equation Models**

Each equation in a structural equation model depicts a causal link between latent and indicator variables. The association is not merely empirical. The values of the indicator variables are produced by a fundamental causal mechanism. That is, all indicator variables are effects of latent variables. The causal and effect variables are unobservable but for each of these, there exists observable indicators (in our case, financial ratios). Researchers who employ a number of indicator variables for each latent variable will obtain a better measure of the latent variable.

The difference between structural equation models and conventional regression analysis is that in the latter a sharp dichotomy is maintained between exogenous and endogenous variables. Each equation in a regression model represents the conditional mean of a dependent variable as a function of explanatory variables. Where exogenous variables are effects of latent constructs, however, the traditional regression analysis is an inadequate means of measurement.

The use of a structural equation model is justified in the present analysis because
capital structure theory suggests that certain hypothesised firm attributes to be its
determinants. These attributes are not directly observable and must be represented by
some observable variable (in our case, accounting data). This is precisely the scenario
contemplated by structural equation models.

The LISREL Computer Program

"LISREL is a general computer program for estimating the unknown coefficients in
a set of linear structural equations."\(^8\) Latent variables and observed measures may be
variables in a system of equations and each latent variable may be associated with one or
more measurable observations. Since these observations are subject to measurement
error, correlation may exist between the observed variables. The LISREL program is
designed to be able to incorporate these measurement errors in its estimation procedure.
Therefore, in addition to estimating all unknown coefficients in the structural equation
system, it also generates the covariance matrices of the residuals and the measurement
error provided identification\(^9\) is achieved.

MODEL SPECIFICATIONS

Many models can exist under the general LISREL model. The one used in the
present analysis may be viewed as a constrained factor analysis model. The general
model consists of two parts: a measurement model and a structural model. The
measurement model defines the relationship between observed measures and their

\(^8\) Joreskog (1982, p.83).

\(^9\) The parameters of a system of equations are said to be identified when enough information
has been supplied to uniquely determine the values of each parameter.

14
underlying constructs. In the context of this study, it relates indicator variables (ratios) to unobservable firm-specific attributes (e.g. size and profitability) and describes the measurement property of these indicators. In factor analytical terms, the measurement model defines the pattern of factor loadings (i.e. how the observed variables load on to each latent variable). For the purpose of this study, the structural equation model specifies the relationship between observed debt ratios (representing capital structure - "endogenous latent variables" in LISREL terminology) and the firm attributes ("exogenous latent variables") which are defined in the measurement model. Following Titman and Wessels, the measurement model can be expressed as:

\[ x = \Lambda \xi + \delta \]  \hspace{1cm} (1)

where \( x \) is a \((q \times 1)\) vector of observable indicators, \( \xi \) is a \((m \times 1)\) vector of unobservable attributes, \( \Lambda \) is a \((q \times m)\) matrix of regression coefficients of \( x \) on \( \xi \) (i.e. a matrix of factor loadings) and \( \delta \) is a vector or measurement errors. In this study, there are six attributes and ten indicator variables. Therefore, the dimensions of \( x \) and \( \lambda \) are \((10 \times 1)\) and \((10 \times 6)\) respectively.

The structural equation model may be expressed as the following system of equations:

\[ y = \Gamma \xi + \epsilon \]  \hspace{1cm} (2)

where \( y \) is a \((p \times 1)\) vector of debt ratios, \( \Gamma \) is a \((p \times m)\) matrix of factor loadings and \( \epsilon \) is a \((p \times 1)\) vector of random errors. The model is estimated for two vectors of debt: short-term and long-term debt scaled by book and market values of equity. Hence, \( y \) is a \((2 \times 1)\) matrix and \( \Gamma \) is a \((2 \times 6)\) matrix of factor loadings.

Note that in equation (1), the unobserved attributes are defined as linear functions
of one or more observed variables plus a random measurement error. Capital structure theories do not indicate the functional form which describes the relationship between observed variables and firm attributes. The LISREL procedure requires that this form be linear. Both the measurement and structural models were estimated simultaneously.

As is shown above, the measurement model is very flexible. It allows the researcher to specify the attribute which causes the measured indicators. The researcher posits which indicators have non-zero loadings on the latent variables. Table 1 shows the specification of factor loadings. Notice that where a variable is not hypothesised to be an indicator of an attribute, the factor loading of that indicator on the attribute is constrained to zero. Hence, the researcher is able to exogenously restrict the number of observable measures which affect the latent variables only to those which are theoretically meaningful.

The above estimation procedure faintly resembles exploratory factor analysis. In this case, however, constraints are exogenously specified whereas in exploratory factor analysis no such a priori specifications are made.

As in factor analysis, the present model rests on the assumption that the measurement errors, $\delta$, are uncorrelated with each other, with the attributes and with errors of the structural equations.

Admittedly, the above model specifications may well be potentially flawed. The constraints imposed on the measurement model, although necessary to achieve identification, appear rather arbitrary. It may be that the constraints have resulted in a misspecification of the model as some of the restrictions may not be appropriate. The
results should, therefore, be interpreted with caution. Nevertheless, as Titman and Wessels indicated, similar restrictions have to be implicitly made in order to interpret a standard regression model that uses proxy variables\textsuperscript{10}.

In contrast to the measurement model, no constraints are placed on the structural model. The debt ratios are allowed to fully interact with the attributes and the impact of each of these attributes on the debt ratios is estimated.

\textit{Estimation of the Parameters}

In LISREL the parameters of the model is estimated by minimizing the function:

\[ F = \log |\Sigma| + tr(s \Sigma^{-1}) - \log |\Sigma| - (p + q) \]

with respect to the vector of parameters of matrices $\Sigma$ and $S$, where $\Sigma$ is the covariance matrix of observable variables implied by the specification of the model above and $S$ is the covariance matrix of these observable variables derived from the sample. It is assumed that the distribution of observed variables can be described by the mean vector and the covariance matrix\textsuperscript{11}. The mean vector is unconstrained, so the estimation procedure essentially involves fitting the covariance matrix $\Sigma$ implied by the model to the sample covariance matrix, $S$. In LISREL, the model is estimated via an interactive generalised least squares procedure. This method gives consistent estimates and the iterative procedure ensures the parameter estimates are successively improved starting with initial estimates generated by the program.

\textsuperscript{10} Titman and Wessels (1988, p.10).

\textsuperscript{11} The "covariance matrix" may be any zero moment matrix, a matrix of variances and covariances and a correlation matrix.
IV. DATA DESCRIPTION

This section describes data sources and the procedures used in the selection of indicator variables (proxying for capital structure determinants).

THE ATTRIBUTES AND THEIR INDICATOR VARIABLES

Section II identifies certain firm attributes as determinants of capital structure. In practical terms, the empirical analysis of these determinants entails the selection of a number of appropriate observed accounting ratios to represent these attributes. The ratios used in this analysis are presented in the following sub-sections.

Collateralizable Assets

Only one indicator of the collateral value attribute is used here. This is the ratio of the sum of inventory and gross plant and equipment over total assets ("INVPTA"). This variable proxies for the existence of collateralizable assets in the firm and is expected to be positively related to leverage. Titman and Wessels used a second measure: ratio of intangible assets to total assets to represent uncollateralizable assets. Due to data limitations, this proxy is not used in the present study.

Non-debt tax shields

Two measures of non-debt tax shields are used in this study. The first one is the ratio of depreciation over total assets ("DEPTA"). This is justified on the basis that Australian taxation laws allow for tax deductions on some depreciation expenses.
Admittedly, this measure is inaccurate since not all depreciation expenses are tax deductible. In addition, these tax deductions do not include deductions on intangible assets (e.g., research and development) and, hence, only partially capture the non-debt tax shield hypothesised by DeAngelo and Masulis. Given time and data limitations, however, the measure could not be adjusted for these additional factors. Following Titman and Wessels (1988) a second direct measure of non-debt tax shield is calculated using income tax payments \((T)\), operating income \((OI)\), interest payments \((i)\) and the corporate tax rate during the sample period \((42\%)\) using the following equation:

\[
NTD = OI - i - \frac{T}{0.42}
\]  

(3)

Size

The natural logarithm of sales is used as a measure of size. Other proxies such as the average growth in total assets could be used. However, the latter could also be an indicator of growth opportunities (and is in fact used for this). Since growth opportunities is an attribute which is also tested in this model, using the average growth of total assets to proxy for size would result in the problem of having too few proxies for too many attributes. It is not possible, to distinguish between a size effect and growth opportunities if only one indicator variable is used to represent both attributes.

Profitability

Following Titman and Wessels (1988) the ratio of operating income over total assets ("OITA") and the ratio of operating income over sales ("OISALES") are used as
measures of profitability. In addition, the return on owner's equity is used as an additional indicator variable. This proxy is calculated as the ratio of net income after interest and expenses over the number of outstanding ordinary shares. This is often used in accounting as a measure of firm profitability since, as its name implies, it is a measure of the return shareholders expect from their investment in the equity of the company.

**Growth Opportunities**

In this study, the average growth rate of total assets is used as an indicator of growth opportunities ("AVGRTA"). Other possible proxies used by Titman and Wessels (1988) are the ratio of capital expenditures over total assets and the ratio of research and development cost over sales. The numerator values for both of these ratios could not be obtained from the database which was the main source of data for this study and were, therefore, omitted.

**Cash Holdings**

Two measures of Cash Holdings are used: the sum of cash, bank deposits and marketable securities scaled over, first, current debt and second, current and long term debt ("CAACL" and "CACLLL"). This attribute was not included in the study by Titman and Wessels (1988). However, following Jensen (1986) cash-rich firms should be more highly leveraged to prevent managers from wasting free cash flow on unprofitable projects and hence, reduce their attractiveness as takeover targets. The pecking order hypothesis, however, predicts the contrary relationship. Greater holdings of cash imply
the availability of more internal funds and hence a lower requirement for debt\textsuperscript{12}. Therefore, two theories give rise to two competing hypotheses in this case.

\textit{A Concluding Comment About The Ratios}

A total of 10 ratios are used to measure the 6 attributes. The hypothesised sign for each attribute is summarised in Table 3. Given time, data and statistical limitations the above ratios are the best proxies that can presently be used. Undoubtedly, they can be improved. For example, the measure of non-debt tax shield could be adjusted to take into account inflation - a more accurate measure of the DeAngelo-Masulis attribute. Other determinants identified in section II such as, uniqueness and directors' holdings are not tested because of data limitations. The uniqueness attribute is usually represented by research and development expenses or selling and advertising expenses scaled by sales. These two numerators, however, could not be obtained from the data source. Figures on directors holdings are normally included only in the notes to accounts in company annual reports and must be collected manually. Given time limitations, it was not possible to obtain a reasonable sample set of this measure for the present analysis. Nonetheless, the above set of attributes is the most comprehensive set that has ever been employed in any cross-sectional study of capital structure in Australia.

\textit{MEASURES OF FINANCIAL LEVERAGE}

Following Titman and Wessels (1988) four measures of financial leverage are used in this analysis. They are long-term and short-term debt divided by the book values and

\textsuperscript{12} Under the pecking order hypothesis the implicit assumption is that managers ultimately make the financing decisions and hence, impose their preferences on the firm's capital structure.
market values of equity\textsuperscript{13}. Most studies use one common measure of leverage (e.g. total debt over equity) and regress this against explanatory variables. However, some of the capital structure theories predict different relationships between firm attributes and different measures of leverage. For example, Myers (1977) hypothesise that short term debt should be positively related to smaller firm size, whereas long-term debt may be negatively related to larger firm size.

Due to data limitations debt is measured in terms of book values rather than market values. Certainly, capital structure theory indicates that market values are more pertinent. As a practical matter, however, almost all covenants in loan agreements and most accounting numbers which are reported are expressed in terms of book values. In addition, most empirical studies have used these values. Theoretical justifications may also exist for the use of book values. Myers (1977) suggested that book values are related to the value of assets already in place which are used to support debt. Whilst the market value of a firm may be significantly influenced by the present value of growth opportunities, these are not collateralizable and can support less debt. Hence, debt contracts can be expected to be written around book values and the amount of debt outstanding is related to these values. In addition, Titman and Wessels (1988) cited evidence indicating that the cross-sectional correlation between book and market values of debt is very large. Hence, any misspecification would probably be very small\textsuperscript{14}.

The use of market values and book values of equity as the denominator in measuring financial leverage is justified on the basis that they assist in identifying true

\textsuperscript{13} Titman and Wessels (1988) also used convertible debt, but, data on this is not readily available in Australia.

\textsuperscript{14} See Titman and Wessels (1988, p.7) and also Bowman (1980).
capital structure effects from false causation implied by spurious correlation. As Titman and Wessels (1988) argued, spurious correlation may exist between the explanatory and dependent variables if financial leverage is measured using book values when, in fact, managers make financing decisions with a target market value of debt in mind. Some firm attributes (explanatory variables) may have a true relationship with market value measures but none with book value debt figures. In some cases, however, market values of debt may be related to the denominator of the leverage measure (i.e. equity) and give rise to a spurious relation between the explanatory variable (an attribute) and book debt ratios. If some firms set targets in terms of book values and others in terms of market values, the direction of the spurious correlation is opposing. Scaling debt with market and book values of equity, then, become important. Since capital structure theories are independent of book value or market value considerations in terms of the predicted direction of effect that an attribute has on financial leverage, the same sign should be obtained for coefficient estimates of both types of leverage measures. If opposing signs are obtained, then, the different denominators may help separate the capital structure effects from spurious ones. This assumes, of course, that there are no competing capital structure theory affecting the direction of impact. For example, some theories do predict different signs for different measures of leverage (e.g. short-term debt is predicted to be positively related to growth opportunities but long-term debt should be negatively related in this case).

DATA SPECIFICATIONS

Data for the ratios discussed in the previous section are sourced from the Annual Report file of the Australian Graduate School of Management ("AGSM") database at the University of New South Wales. Accounting numbers are extracted for all companies.
They are not classified by industry codes. The final sample of companies selected satisfies two criteria.

(i) A complete record of accounting numbers for all the variables needed to calculate financial ratios must exist for the company throughout the period of study. In cases where zeros were found, the company was deleted because of the associated ambiguity. It is uncertain whether the zeros represent missing data or are valid accounting numbers\(^{15}\).

(ii) In some cases the sales variable was used as a denominator. Where this was zero or negative the record was also deleted\(^{16}\).

As Titman and Wessels pointed out, the above requirements may bias the sample towards relatively large firms. Unfortunately it is not feasible, given time constraints, to verify this. The final sample comprise of 226 firms across all industries.

The sampling period is divided into three sub-periods of three years each. Each ratio is averaged over the three year period from which it is extracted to reduce measurement errors due to year-to-year random fluctuations.

The financial leverage ratios are measured over the period 1980-1982. The indicator of the future growth attribute, the average growth rate of total assets, is measured from 1983 through to 1985. Realised asset values proxy for the expected growth rate applicable when the capital structure decision was made. The indicator

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\(^{15}\) The model was tested with these companies included in the sample, but problems were encountered in applying the statistical procedure as the zeros were treated as missing values by the program.

\(^{16}\) In contrast to Titman and Wessels, none of the total asset figures were negative or zero.
variables for the following attributes are derived from the period 1980-1982: collateral value of assets, non-debt tax shield and cash holdings. Ratios representing the profitability and size attributes are derived from the period 1977-1979. Measuring profitability from an earlier period is justified on the basis that it influences the amount of earnings retained by a firm. Hence, it is used to test the predictions of the pecking order hypothesis. An historic profitability measure also facilitates the test for a long term effect of this attribute on financial leverage. Past profitability is also used in this study as an imperfect proxy for expected future profitability. Since profitable firms can be expected to increase in size, a spurious correlation may arise between size and debt ratios. For this reason, the indicator of size is derived from the same period as the indicators of profitability to avoid any spurious relation. Unfortunately, this relation may not be avoided altogether. As Titman and Wessels pointed out, profitable firms increase their net worth and a short term relationship may exist between profitability and debt. Since size and profitability are related, a spurious relationship between size and debt may also arise.

Finally, the sample is standardized by subtracting from each observation its mean and dividing it by its standard deviation. This is done to avoid problems associated with differing units of measurement inherent in the sample.

It should be noted that this sample set may suffer from some sampling biases. Since it includes firms from a broad range of industries, the differences in financial leverage across industry groups (shown to exist by Ferri and Jones (1979) and Bradley, Jarrel and Kim (1984)) have been assumed away. Bradley, Jarrel and Kim reported that industrial classifications determine almost 54% of the cross-sectional variance in leverage ratios. The significance of industrial classification on capital structure has not been tested
in Australia; if it were as significant as that reported by Bradley, Jarrel and Kim, then, the interpretative power of the results in this study may be dampened by the absence of industrial delineation of the sample. It was also pointed out in the introductory paragraph of this section that the selection procedure may bias the sample towards large firms. This may also bias it toward a particular industry class.

V. RESULTS

The estimates of the parameters of the measurement model are presented in Table 2. Generally, the results show that the indicator variables measured the underlying attributes well. The direction of effect for each indicator variable is generally in accord with theoretical predictions17 and this is supported by significant parameter estimates. It is reasonable to conclude that the indicator variables captured the constructs which were hypothesised to be determinants of capital structure, hence, it would be appropriate to consider the impact of these determinants on financial leverage (structural model). This is in general agreement with the conclusion reached by Titman and Wessels who used similar indicator variables.

The estimates of the structural model are presented in Table 4. These estimates show the relationship between the determinants of capital structure and financial leverage. They are estimates of the impact that the determinants have on firm leverage ratios. In general, the direction of impact supports theoretical predictions. For example, the profitability attribute significantly influenced all three out of the four measures of leverage in the negative direction in accordance with the pecking order hypothesis. An

17 The exceptions are two indicator variables: one for non-debt tax shield and the other for profitability.
interesting and exciting result is that associated with the non-debt tax shield attribute.

The parameter estimates of non-debt tax shield show that this attribute is negatively related to leverage and significant at the 1% level for three out of the four leverage measures. It is interesting to note that this is the first evidence, to our knowledge, that is consistent with the DeAngelo-Masulis (1980) hypothesis. Most studies have either found an insignificant negative effect (Long and Malitz (1985)) or a perverse relationship where the direction of impact is positive and significant (Bradley, Jarrel and Kim (1984), MacKie-Mason (1988) and Sharpe and Pooley (1990)).

There is also strong supporting evidence for the pecking order hypothesis. The negative relationship between profitability and leverage predicted by the hypothesis is demonstrated for three out of four leverage measures and all the parameters are highly significant even at the 1% level. This result provides evidence consistent with the pecking order hypothesis of Myers (1977) that firms prefer to finance first with internal funds before raising external financing. It is also consistent with overseas and Australian evidence (Friend and Hasbrouck (1986), Titman and Wessels (1988) and Sharpe and Pooley (1990)).

A positive and significant relationship between profitability and long-term debt scaled by market value of equity is present. This is consistent with the prediction of Ross’ signaling theory. The relatively weak relationship in terms of the magnitude of the coefficient may be due to the positive relationship between future profitability and total market value of the firm thus dampening the effect on debt relative to market value of equity. The use of long-term debt is also consistent with the signaling hypothesis - managers can be expected to use this kind of finance to signal the future profitability of a
firm. Unfortunately, the indicator variables used in this study measured past profitability and although it could be argued that, under some form of naive expectations model, past profitability may be an imperfect proxy for expected future profitability, this is an unlikely scenario given the very strong negative impacts of this measure on other leverage measures. For this reason, the positive relationship is more likely to be a statistical anomaly.

The positive relationship between the size attribute and financial leverage is consistent with the view that larger firms are well diversified and is able to include more debt in its capital structure. This attribute is significantly positive at the 10% level for one of the leverage measures: the ratio of short-term debt to the market value of equity. This result appears to be consistent with the predictions of Myers (1977) who suggested that firms with growth opportunities should use short-term financing to reduce the agency cost of debt. Since larger firms are expected to be able to expend funds on research and development which generate future growth, these firms face larger agency costs and should utilise more short term financing.

The positive relationship between firm size and short-term debt is further supported by a positive relationship between the growth attribute and short-term debt scaled by market values and book values of equity (see the column marked "growth" in Table 4). Curiously, the growth attribute is significant and positive (although the magnitude of the coefficient is relatively small) in respect of long-term debt relative to market value. This result is inconsistent with the agency-based theory which suggests that high growth firms have less tangible assets and are able to support less debt and hence a negative result is expected\(^\text{18}\). A positive result, however, is perfectly intelligible.

\(^{18}\) See Section II for a further discussion of this.
if growth opportunities are viewed as adding value to the firm and thus, increasing its debt capacity. At the same time, growth opportunities tend to increase the market value of a firm and hence has a dampening impact on debt scaled by this value. Hence, the positive relationship between leverage scaled by market value can be expected to be relatively weak.

Although no significant results were obtained for the cash holdings and collateral value attributes the general direction of effect of the cash holdings attribute on leverage accords with Jensen’s "free cash flow" hypothesis. The positive relationship between cash holdings and leverage indicate that cash rich firms include more debt in their capital structures. This increase in the use of debt may be motivated by the desire of shareholders to bond managers to specific projects and to prevent managers from wasting free cash flow. Managers on their part, have an incentive to distribute cash to avoid decreasing firm value which impacts negatively on their compensation plans. As pointed out in Section II this is the first evidence supportive of Jensen’s hypothesis in the context of capital structure. The generally negative effect of the collateral value attribute on leverage is inconsistent with the relationship predicted by agency theory. Due to data limitations only one indicator was used to measure the collateral value attribute. It is possible that this was inadequate to substantially capture this particular firm characteristic. Indeed, the estimate in the measurement model shows that the ratio of inventory plus gross plant and equipment over total assets (INVPTA) was positive but very insignificant.

In general, the results indicate that the attributes impact on leverage measures in accordance with a priori expectations. In particular, the consistently negative and significant relationship between non-debt tax shield and all measures of leverage is fresh
evidence in capital structure testing. The positive impact of cash holdings on leverage provides the first evidence on free cash flow as a determinant of capital structure. Elsewhere, the results also support the well established "pecking order" hypothesis (i.e. a negative impact of profitability on leverage) and the generally positive relationship between the size and growth opportunities attributes is consistent with the view that larger firms are well diversified or have higher values and hence are able to accommodate a higher level of debt in their capital structures. The one result which is in contrast to expectations is the negative impact of the collateral value attribute on leverage. Within the context of capital structure theory and taking into consideration the indicator variable used to measure this attribute, the negative relationship is difficult to explain.

VI. CONCLUSION

This study seeks to provide evidence on the importance and significance of capital structure determinants in the Australian context. The analysis was implemented on a sample of 226 Australian companies from 1977 to 1985. The following results are obtained.

Company non-debt tax shields display a negative relationship with respect to each of the debt ratios. This evidence is consistent with the theory proposed by DeAngelo and Masulis (1980) that firms with non-debt tax shields at their disposal can use these as substitutes for interest tax shields. These firms enjoy the benefits of tax deductions without the burden of debt.

The evidence canvassed also lend some support to the pecking order hypothesis of Myers and Majluf (1984). Specifically, significant negative relationships between
profitability and all debt ratios are found. The implication is that the sample of firms studied prefer to finance investments with internally retained funds before issuing debt. This may be due generally to an aversion on the part of managers towards the use of debt finance. This is not surprising given that the indicators of profitability are measured over the period 1977-1979. The oil-shock threw the country into recession and the rising interest rates increased greatly the risk associated with holding debt.

Some evidence of a size effect is present and this indicates that the larger firms in the sample tended to employ more debt in their capital structures. Theory suggests that this is due to the ability of these firms to diversify their operations and reduce their risk profiles.

The positive relationship between cash holdings and debt ratios indicate some support for the free cash flow hypothesis of Jensen (1986) although these estimates are not significant.

Consistent with the findings of Titman and Wessels (1988), no support for the growth opportunity and collateral value attributes as determinants of debt ratios can be discerned.

Despite the overall encouraging results the study is not without limitations. Specifically, the number of restrictions imposed on the measurement model may not have been totally appropriate. If the indicator variables do not really reflect the nature of the attributes they are hypothesised to represent, then the restrictions may have resulted in a misspecification. To mitigate this problem, more indicator variables should be used to represent each attribute. In addition, the non-debt tax shield attribute could be adjusted
for inflation to take account of true economic depreciation. Finally, the small sample size used and the absence of adjustments for inter-industry differences in capital structures make the results less generalisable. A fruitful line of future research would be to address and tackle the above limitations and hitherto unexplored aspects in this area.
### Table 1

**Measurement Model: Restrictions Imposed**

\[
\begin{bmatrix}
\lambda_{1,1} & 0 & 0 & 0 & 0 & 0 \\
0 & \lambda_{2,2} & 0 & 0 & 0 & 0 \\
0 & 0 & \lambda_{3,3} & 0 & 0 & 0 \\
0 & 0 & 0 & \lambda_{4,4} & 0 & 0 \\
0 & 0 & 0 & 0 & \lambda_{5,5} & 0 \\
0 & 0 & 0 & 0 & 0 & \lambda_{6,6} \\
0 & 0 & 0 & 0 & 0 & 0 \\
\end{bmatrix}
\begin{bmatrix}
\xi_1 \\
\xi_2 \\
\xi_3 \\
\xi_4 \\
\xi_5 \\
\xi_6 \\
\end{bmatrix}
\begin{bmatrix}
\delta_1 \\
\delta_2 \\
\delta_3 \\
\delta_4 \\
\delta_5 \\
\delta_6 \\
\delta_7 \\
\delta_8 \\
\delta_9 \\
\delta_{10} \\
\end{bmatrix}
\]

Note, the variables are ratios and defined as follows:

- **INVPTA** = Inventory and gross plant and equipment/total assets
- **DEPTA** = Depreciation/total assets
- **NDTIA** = Direct measure of non-debt tax shield
- **CACL** = Cash, bank overdraft and marketable securities/current debt
- **CACLLL** = Cash, bank overdraft and marketable securities/current and long-term debt
- **LNSALES** = Natural log of sales
- **OITA** = Operating income/total assets
- **OISALES** = Operating income/sales
- **RTNOE** = Return on owner’s equity
- **AVGRTA** = Average growth rate of total assets
Table 2

Measurement Model: Loadings for Independent Variables*

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>$\xi_1$ (Collateral Value)</th>
<th>$\xi_2$ (Non-debt tax shield)</th>
<th>$\xi_3$ (Cash Holdings)</th>
<th>$\xi_4$ (Size)</th>
<th>$\xi_5$ (Profitability)</th>
<th>$\xi_6$ (Growth)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVPTA</td>
<td>0.497</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.903)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPTA</td>
<td>0.300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(8.333)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NDTTA</td>
<td>-0.590</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(-8.333)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CACL</td>
<td>0.778</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(17.030)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CACLXL</td>
<td>0.940</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(17.030)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LNSALES</td>
<td>0.343</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.721)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OITA</td>
<td>0.531</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(19168)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OISALES</td>
<td>-10.716</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(188001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTNOE</td>
<td>12.680</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(268075)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AVGRTA</td>
<td>0.099</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.132)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) t-statistics are reported in parentheses.
### Table 3

**Hypothesised and Actual Signs of Each Firm Attribute**

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Hypothesised Sign</th>
<th>Titman &amp; Wessels</th>
<th>This Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collateral Value</td>
<td>+</td>
<td>±(^1)</td>
<td>-</td>
</tr>
<tr>
<td>Non-debt tax shield</td>
<td>-</td>
<td>-</td>
<td>_(^b)</td>
</tr>
<tr>
<td>Cash Holdings</td>
<td>±</td>
<td>N/A</td>
<td>±(^2)</td>
</tr>
<tr>
<td>Size</td>
<td>+</td>
<td>-</td>
<td>+(^a)</td>
</tr>
<tr>
<td>Profitability</td>
<td>-</td>
<td>-</td>
<td>±(^{1b})</td>
</tr>
<tr>
<td>Growth Opportunities</td>
<td>±</td>
<td>±</td>
<td>+(^1)</td>
</tr>
</tbody>
</table>

b = significant at 1%
* = significant at 5%
** = significant at 5% and one estimate significant at 10%
a = one estimate significant at 10%
1 = three estimates are negative and one is positive
2 = three estimates are positive and one is negative

35
Table 4

Estimates of Structural Coefficients

<table>
<thead>
<tr>
<th>DEBT MEASURES</th>
<th>( \xi_1 )</th>
<th>( \xi_2 )</th>
<th>( \xi_3 )</th>
<th>( \xi_4 )</th>
<th>( \xi_5 )</th>
<th>( \xi_6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Collateral Value</td>
<td>Non-debt tax shield</td>
<td>Cash Holdings</td>
<td>Size</td>
<td>Profitability</td>
<td>Growth</td>
</tr>
<tr>
<td>LTDMV</td>
<td>-0.557</td>
<td>-0.0193</td>
<td>-0.104</td>
<td>0.253*</td>
<td>0.121</td>
<td>0.327</td>
</tr>
<tr>
<td></td>
<td>(-1.483)</td>
<td>(-0.448)</td>
<td>(-0.138)</td>
<td>(0.232)</td>
<td>(3.573)*</td>
<td>(2.024)**</td>
</tr>
<tr>
<td>STDMV</td>
<td>0.034</td>
<td>-2.280</td>
<td>0.599</td>
<td>1.681</td>
<td>-2.249</td>
<td>0.342</td>
</tr>
<tr>
<td></td>
<td>(0.031)</td>
<td>(-11.867)*</td>
<td>(0.437)</td>
<td>(1.838)*</td>
<td>(-30.841)*</td>
<td>(0.0508)</td>
</tr>
<tr>
<td>LTDBV</td>
<td>-0.253</td>
<td>-4.100</td>
<td>0.871</td>
<td>0.912</td>
<td>-3.715</td>
<td>-1.063</td>
</tr>
<tr>
<td></td>
<td>(-0.209)</td>
<td>(-6.879)*</td>
<td>(0.435)</td>
<td>(0.580)</td>
<td>(-58.009)*</td>
<td>(-1.033)</td>
</tr>
<tr>
<td>STDBV</td>
<td>-0.286</td>
<td>-2.560</td>
<td>0.553</td>
<td>1.800</td>
<td>-2.095</td>
<td>1.296</td>
</tr>
<tr>
<td></td>
<td>(-0.176)</td>
<td>(-5.633)*</td>
<td>(0.265)</td>
<td>(0.762)</td>
<td>(-39.060)*</td>
<td>(1.549)</td>
</tr>
</tbody>
</table>

* = significant at 1%
** = significant at 5%
‘a’ significant at 10%

t-statistics are reported in parentheses.
REFERENCES


Pinegar, J.M., and R.C. Lease, "The Impact of Preferred-for-Common Exchange Offers on


